

REMARKS

Status of the Claims

Claims 1 – 20 are pending. No claims are cancelled. Claims 9 – 18 stand withdrawn from consideration.

Claim 1 is amended to improve readability.

New Claim 19 is supported as is Claim 3.

Claim 20 is supported by page 11, line - page 12, line13 discussing the tunnel feeding the furnace.

Claim Rejections

- I. Claim 1 stands rejected under 35 U.S.C §103(a) over US 6,004,504 to Vallomy¹ (hereinafter, “Vallomy ‘504”) and JP 08-005248 (hereinafter “JP ‘248”).

Claim 1 is directed to a method for pre-heating, transforming and melting a metal charge comprising metal scrap, in an electric arc furnace associated with a tunnel that transports, pre- heats and discharges said scrap, the furnace comprising a hearth and a roof through which the electrodes pass, comprising the steps of:

- weighing the furnace at least periodically to detect the quantity of discharged scrap from the tunnel delivered to and present inside the furnace itself;
- detecting the temperature of the liquid bath inside the furnace at least periodically, and
- at least the discharge delivery of the scrap from the tunnel to inside the furnace is detected by said weighing and is regulated to maintain said temperature of the liquid bath around a pre-determined value.

The invention of claim 1 provides a method to control and maintain the temperature of the bath at a pre-set value by acting on the discharge delivery of the scrap into the furnace. The temperature of the bath can change each time an amount of new scrap is delivered inside the furnace. To control this, according to the invention of claim

¹ Note: Applicant's have assumed that the Office action intended to refer to US 6,004,504 instead of US 6,005,504.

1, the discharge delivery of scrap into the furnace is detected by weighing periodically or continuously the whole furnace system. As expressed on page 7, lines 22 – 25 of the present specification, “[f]or measuring the quantity of scrap, the invention provides that the whole ‘furnace system’ is continuously weighed, removing the tare, known in advance, in order to find how much scrap is present inside.” On page 13, line 30 – page 14, line 1, the specification also explains, “[t]hroughout the loading cycle, the weight of the furnace system and the temperature of the bath are monitored periodically, or also continuously, in order to regulate the unloading of the scrap so as to keep the temperature of the bath substantially constant.”

Applicant respectfully requests reconsideration of whether all of the elements claimed in claim 1 were known in Vallomy ‘504, and JP ‘248, whether one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and whether the combination would have yielded nothing more than predictable results to one of ordinary skill in the art.

As expressed by the U.S. Supreme Court, “[t]he rationale to support a conclusion that the claim would have been obvious is that all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art.”² Furthermore, “[t]he determination of obviousness is made with respect to the subject matter as a whole, not separate pieces of the claim.”³

² MPEP §2143, citing *KSR*, 550 U.S. at ___, 82 USPQ2d at 1395; *Sakraida v. AG Pro, Inc.*, 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); *Great Atlantic & P. Tea Co. v. Supermarket Equipment Corp.*, 340 U.S. 147, 152, 87 USPQ 303, 306 (1950) (emphasis added).

³ *Sanoji-Synthelabo, Inc. v. Apotex, Inc.* Fed. Cir. 2007-1438 (2008), citing *KSR Int'l Co. v. Teleflex, Inc.* 127 S.Ct. 1727, 1734 (2007); and *Kimberly-Clark Corp. v. Johnson & Johnson*, 745 F.2d 1437, 1448 (Fed. Cir. 1984).

A) Whether all of the elements claimed in claim 1 were known in Vallomy '504, and JP '248.

- 1) Claim 1 requires at least the discharge delivery of the scrap inside the furnace is detected by weighing and is regulated to maintain said temperature of the liquid bath around a pre-determined value.

Neither Vallomy '504 nor JP '248 disclose or suggest regulating the discharge delivery of the scrap into the furnace to maintain the temperature of the liquid bath around a pre-determined value. Moreover, this feature is not suggested by the combination of these two documents.

As acknowledged on page 3 of the Office action, Vallomy '504 does not disclose weighing the furnace periodically and detecting and regulating as in Claim 1. Indeed, Vallomy '504 relates to controlling bath level in a steelmaking process. As explained by Vallomy '504 in column 1, line 66 – column 2, line 7, controlling the bath level is important to maintain a continuous steelmaking process, helps insure immediate melting of a metallic charge, and “allows for proper placement of sensing equipment and material injectors in relation to the steel bath level.”

JP '248 discloses weight measurement means that can measure the weight of the furnace and can know material provisioning weight by measuring the weight change continuously. However, JP '248 neither discloses nor suggests to use the values of the weight detected to adjust the discharge delivery of the scrap to maintain the temperature of the liquid bath at a pre-set value.

Again, neither Vallomy '504 nor JP '248 disclose or suggest regulating the discharge delivery of the scrap into the furnace to maintain the temperature of the liquid bath around a pre-determined value. Moreover, neither reference suggests a possible correlation between the discharge delivery and the liquid bath temperature.

JP '248 merely discloses a method in which the furnace is weighted, and the discharge delivery of the scrap into the furnace is related to the feed rate of discharge of the molten metal from the furnace, to maintain the overall weight of the furnace to a pre-set value and avoid variations in the weight of the furnace body, and further to maintain the level of the molten metal at a substantially constant value. The discharge delivery of

the scrap into the furnace is not regulated to maintain the temperature of the liquid bath around a pre-determined value.

In fact, JP '248 provides a distinct means for controlling temperature. In paragraph [0013], JP '248 states the molten metal temperature is also inputted into an operation and a controller, which self adjust the electric power unit so that molten metal temperature may be in agreement with a preset value. Clearly, the temperature control provided by JP '248 is not linked to or related to the discharge delivery of the scrap.

2) Claim 1 provides a method to control and maintain the temperature of a bath at a pre-set value.

Neither Vallomy '504 nor JP '248 disclose or suggest the feature of a pre-set value of temperature of the liquid bath to be maintained. Moreover, this feature is not suggested by the combination of these two documents. Vallomy '504 relates to controlling bath level. JP '248 relates to maintaining the overall weight of a furnace to a pre-set value, and to maintaining the level of the molten metal at a substantially constant value.

B) Whether one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions.

Since the cited references do not disclose all of the elements claimed in claim 1, applicant respectfully submits one skilled in the art could not have combined the elements as claimed.

C) Whether the proposed combination would have yielded nothing more than predictable results to one of ordinary skill in the art.

Since the cited references do not disclose all of the elements claimed in claim 1, applicant respectfully submits the proposed combination would not result in the present invention.

For at least these reasons, Applicant respectfully submits the Office action does not establish a *prima facie* case of obviousness. Favorable reconsideration and action is requested.

II. Claims 2 – 5 stand rejected under 35 U.S.C §103(a) over Vallomy '504, JP '248, US 5,099,438 to Gulden, Jr. et al. (hereinafter, "Gulden").

The additional references are cited only with regard to features of dependent claims 2 – 5, and do not cure the deficiencies discussed above with regard to rejection I. Thus, applicant respectfully submits that the proposed combination does not establish a *prima facie* case of obviousness.

Moreover, JP '248 is simultaneously feeding scrap and discharging molten metal. Thus, measures weight to keep the metal level in the furnace constant. This is not the case, as for example stated in present claim 3, where scrap loading is stopped before tapping the furnace. Thus, the motivation of JP '248 is further irrelevant the invention of present claim 3.

Vallomy '504 also appears to be for a continuous steelmaking process where electrodes remain at full power during continuous feeding, refining and tapping (See Vallomy, col. 1, lines 43-45 and col. 2, lines 38-42).

III. Claim 6 stands rejected under 35 U.S.C §103(a) over Vallomy '504, JP '248, Gulden, US 4,564,388 to Vallomy (hereinafter, "Vallomy '388"), US 3,772,000 to Hyde et al. (hereinafter, "Hyde"), and US 4010,026 to Engledow (hereinafter, "Engledow").

The additional references are cited only with regard to features of dependent claim 6, and do not cure the deficiencies discussed above with regard to rejection I. Thus, applicant respectfully submits that the proposed combination does not establish a *prima facie* case of obviousness.

IV. Claim 8 stands rejected under 35 U.S.C §103(a) over Vallomy '504, JP '248, Gulden, and US 4,679,773 to Wunsche (hereinafter, "Wunsche").

The additional references are cited only with regard to features of dependent claim 8, and do not cure the deficiencies discussed above with regard to rejection I. Thus, applicant respectfully submits that the proposed combination does not establish a *prima facie* case of obviousness.

V. Fee Authorization

Please charge any shortage in fees due in connection with the filing of this paper, including any shortage in Extension of Time fees, to Deposit Account 14.1437. Please credit any excess fees to such account.

VI. Conclusion

The present application is in condition for allowance, and applicant respectfully requests favorable action. To facilitate the resolution of any questions, the Examiner is welcome to contact the undersigned by phone.

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